

STORM-BOTS

**Soft and Tangible Organic
Responsive Materials progressing
roBOTic functionS**



This project has received funding from the European Union's Horizon2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956150

**ISSUE 3
JANUARY 2024**

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Editorial

Dear reader,

On behalf of the STORM-BOTS team, I'm delighted to present our third newsletter. We have just completed the third year of the project, with most of the ESRs now in the last part of their individual projects.

During this last year, we have been able to gather at two different events, for the Bootcamp in Pisa and the 3rd Symposium in Tampere. These events have been pivotal moments in our project and gave way to invaluable exchanges and connections not only among the STORM-BOTS members but also with the external participants and guests.

Our ESRs have dived deep into their projects, actively engaging in diverse training activities, and continuing their good work and results which have been reflected in numerous scientific publications and presentations at international conferences. Their contributions, as regularly evidenced through symposium presentations, conference involvements, and scientific publications, confirm their dedication and growing expertise. Moreover, the ongoing secondments have provided an important part of the action, enhancing the experience of our ESRs, and taking even further the collaboration between all the research teams involved in the project.

As we start the fourth and final year of our project, the enthusiasm for continued learning, collaborative research, and participation in forthcoming events continues.

Thank you for your support and participation in this shared journey.

Best regards,

Carlos Sánchez Somolinos. STORM-BOTS Coordinator



What has happened so far

Boot-camp SSSA

Prof Antonio DeSimone and his team organised the third network-wide training activity which took place from the 27th of February to the 2nd of March, 2023, at the Scuola Superiore Sant'Anna (SSSA), Pisa, and the BioRobotics Institute, Pontedera, Italy.

The Boot-camp aimed to provide fellows with first-hand training on FEM modelling, to give them the opportunity to present their projects to STORM-BOTS members and external researchers and immerse them in the research carried out at the Excellence Centre of BioRobotics Institute as well as encouraging them to engage in valuable scientific discussions and networking.



The program included:

- **Specialized training in FEM modelling of large deformations.** The ESRs were introduced to finite element method (FEM) modelling and trained in the use of specialized software for multiphysics modelling such as COMSOL. This training session was led by Prof Alessandro Lucantonio, a STORM-BOTS supervisor and expert on the theoretical and computational modelling of multiphysics systems.
- **Projects on the table:** the ESRs presented the progress of their projects to the other teams of the network and gave an update on their training activities.
- **Poster Session:** poster and pitch presentations of the ESRs open to all the members of the BioRobotics Institute.
- **Visit of the BioRobotics Institute** and its laboratories and research groups, hosted by Reza Norouzikudiani (ESR-6).
- **Lectures** from experts on Bioinspired and soft robotics, surgical robots, and soft electronics, including Prof Barbara Mazzolai, a member of the External Advisory Board of STORM-BOTS.

The boot-camp was an important training event for the STORM-BOTS fellows and all its members and was held at an especially relevant moment in the ESRs' individual research projects and careers. The STORMBOTS ESRs received training in FEM modelling and were exposed to cutting-edge research in Europe in the fields of robotics, and its leading researchers, and got relevant feedback from external researchers. The event format encouraged scientific discussion and exchange of ideas. Additionally, the boot-camp opened talks and lectures to external attendees, contributing to the training of other researchers and raising awareness of the STORM-BOTS project within the scientific community and society.



What has happened so far

3rd STORM-BOTS symposium – TAU

The third Symposium – 4th network-wide training activity of the project – was organised by Prof. Arri Priimägi and his team from Tampere University. It took place from 5 to 8 September, at the Hervanta Campus and the Paidia Centre in Tampere, Finland.

The scientific part of the 3rd Symposium was dedicated to responsive materials and soft robotic functions, with presentations from experts in these fields. There was dedicated time also to important transversal skills and topics, relevant to the moment of the ESRs' careers. Another important aspect of this symposium was the networking and discussion opportunity it provided, both with members of STORM-BOTS and external participants.

The program of the 3rd STORM-BOTS symposium included:

- **Projects on the table:** the ESRs presented the progress of their projects to the other teams of the network and gave an update on their training activities.



- **Workshops on transversal skills** - CV writing and crafting meaningful research-based careers - and lectures of interest for the ESRs' present and future careers - Intellectual Property and Commercialization and Artificial Intelligence.
- Theoretical and practical **workshop on Digital Holographic Microscopy**, by Yves Emery from the partner organisation Lyncée Tec.
- **Lab tour**, hosted Yasaman (ESR-10) and Zixuan (ESR-11), for all the ESRs and STORM-BOTS members to visit the facilities of the host group, led by Prof Arri Priimägi.
- **Lectures** from experts on responsive materials, soft and micro-robotics, liquid crystal elastomers and polymeric materials.
- **Open Poster Session:** poster presentations of the ESRs open to all the invited speakers and all the external participants, an activity that gave room for discussion and exchange of ideas.

The 3rd Symposium was a key training event for STORM-BOTS fellows and members, tailored to the career stages of the ESRs. It featured workshops and training activities of an extraordinary level, both on scientific topics and transversal subjects. Moreover, renowned specialists presented lectures on relevant topics like photopolymerization, digital holography microscopy, soft systems, and microrobotics, allowing



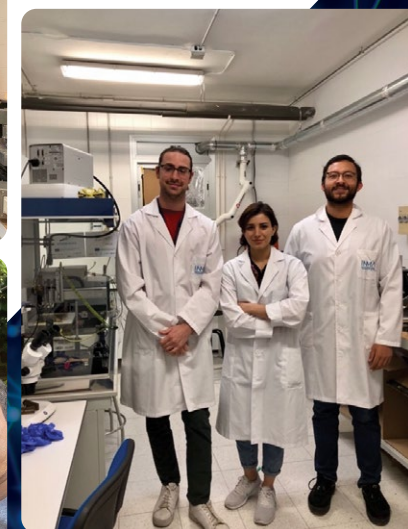
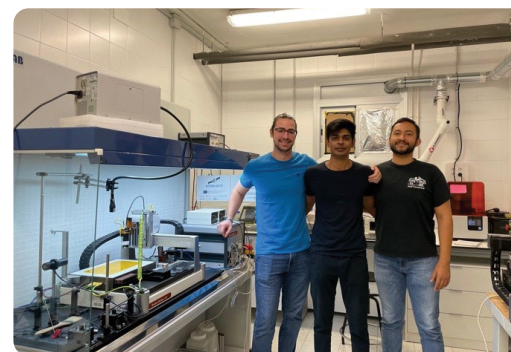
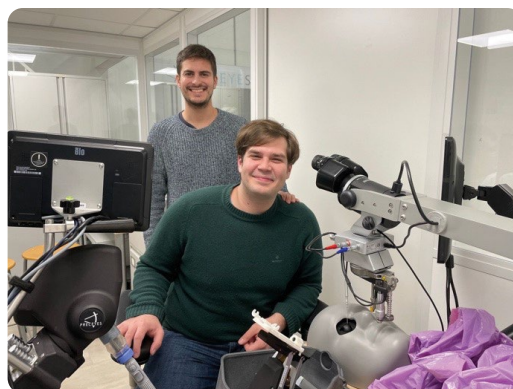
engaging discussions and networking opportunities. The ESRs could also experience and learn how to lead scientific sessions in a conference by acting as chairpersons of the Day 3 and 4 lectures ([see p. 9 for more info](#)). External participants were welcomed to the training activities, enabling them to learn from distinguished scientists and expanding awareness of the STORM-BOTS project.

Other training activities

Secondments

This has been a year of numerous secondments of the STORM-BOTS ESRs! International, inter-sectoral, academic... all types of secondments have taken place this year, adding to those already carried out in 2022. But above all, secondments are an important part of the ESRs' training, enhancing their scientific projects and careers, fostering stronger collaborations, and expanding their professional network.

Rahul, ESR-2 UZ (ES)	CSIC (ES) – Oct 2022 to Feb 2023 AQDOT (UK) – Nov 2023
Erick, ESR-3 CSIC (ES)	MPG (DE) – Jul 2023 TUE, PREC (NE) – Aug to Nov 2023
Lovish, ESR-5 MPG (DE)	CSIC (ES) – Nov 2023
Reza, ESR-6 SSSA (IT)	TUE (NE) – May to Jun 2023
Michał, ESR-7 UCam (UK)	TUE, PREC (NE) – Apr to Jul 2023
Mert, ESR-8 TUE (NE)	PREC (NE) – Sep to Nov 2023
Yasaman, ESR-10 TAU (FI)	CSIC (ES) – May to Jul 2023
Zixuan, ESR-11 TAU (FI)	TUE (NE) – Feb to May 2023
Giulia, ESR-12 TNO (NE)	TUE (NE) – Jan to Jun 2023 CSIC (ES) – Sep to Dec 2023
Tommaso, ESR-13 PREC (NE)	TUE (NE) – Jan to Mar 2023 CSIC (ES) – Sep to Oct 2023



Other training activities

Secondments

Mert, Yasaman and Michał share with us their experience in the secondments they have done this year and how they contribute to their training.

“**Michał (ESR-7):** “I’ve greatly enjoyed my secondments at TUE and Preceyes, which expanded my horizons by entering a well-established experimental group and a rapidly growing company from a mostly theoretical background. Interacting with different but closely related communities gives a great chance to experience different perspectives, which helps keep the mind open and avoid getting stuck in a very specific niche. That being said, the thing I’ve enjoyed most during my secondments was interacting with other ESRs and making lasting friendships!”



“**Mert (ESR-8):** “The training enriched my knowledge of life as a researcher in both academia and industry, all while providing me with the opportunity to develop my research and interpersonal skills in both environments. Most importantly for me, it has helped me understand the connection between industry and academia, giving me an insight also into the entrepreneurial spirit that binds these fields together. I had a great time during my secondment; it is a pleasure to learn within new environments and meet new people. My colleagues in my secondment were especially welcoming and accommodating. It was a challenge to adapt to new equipment and protocols in the workplace, but I feel I improved my adaptability as a worker by overcoming such challenges. I truly enjoyed the chance to meet new colleagues and learn more about the entrepreneurial people that allowed this project to exist. I feel inspired by their endeavours and their attitude, and I hope to adapt it for my future as well.”



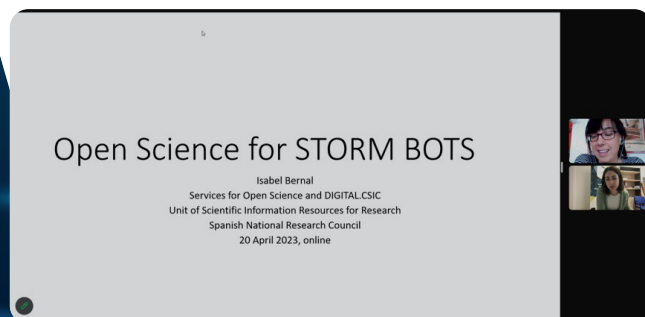
“**Yasaman (ESR-10):** “During my secondment, I found the atmosphere to be exceptionally conducive to learning and professional development. The spirit of cooperation and mutual support among colleagues created an environment where knowledge exchange flourished. This unique experience has undoubtedly contributed to enhancing my skills and expertise, complementing the training received at my host institution. Additionally, it was a great experience to explore different universities and labs and meet new people along the way. This exposure broadened my perspective and allowed for valuable networking opportunities.”



Other training activities

Lecture on Open Science

Isabel Bernal, manager of the CSIC Open Access institutional repository, DIGITAL.CSIC, delivered a lecture on Open Science in April 2023. Open Science and Open Data are essential aspects of research projects like STORM-BOTS. Isabel emphasised the importance of accessible data and information, as well as the impact of Open Data and Open Science. ESRs and all the participants learned how to implement Open Science practices in their everyday work. They also discovered practical tools, to ultimately enhance the diffusion of research results.



Brainstorming session PREC-TUE-TNO

During his secondment at TUE, Tommaso (ESR-13) organised a brainstorming activity in which the participants discussed the possibilities of surgical instruments based on Liquid Crystal Elastomers materials. The ESRs who were at that moment in Eindhoven – Mert (ESR-8), Tommaso (ESR-13), Giulia (ESR-12), Zixuan (ESR-11) and Duygu (ESR-9) – participated in this brainstorming session, providing the points of view from their research project and experiences.



Other training activities

Tommaso visited the Hospital Clínico Universitario Lozano Blesa

During his secondment at CSIC, Tommaso (ESR-13 at PRECEYES) visited the Ophthalmology Department of the Hospital Clínico Universitario Lozano Blesa in Zaragoza, to see first-hand surgical procedures. Tommaso was kindly hosted by CSIC collaborator Dr Francisco Javier Lara Medina, a vitreoretinal surgeon at this Hospital, and his colleagues Dr Isabel Bartolomé and Dr Javier Ramos.

Tommaso tells us more about this experience: "It has been an amazing opportunity to see how vitreoretinal surgery is performed. It is impressive to realize how the surgeons manage to face the complex steps of these procedures, such as Inner Limiting Membrane peeling. I was particularly impressed about the level of dexterity required to interact with the delicate anatomical structures of the eye at a micrometer scale. The demand for accuracy and precision shows the potential of soft robotics in this specific application, to allow an even safer interaction with the retina and, in this way, improve the surgical outcome. I thank Carlos – STORM-BOTS coordinator and Tommaso's secondment supervisor - for giving me this opportunity and Javier for walking me through the complete surgery."



Course on Valorisation of Scientific Results attended by Mert

Mert Orhan Astam (ESR-8) who is doing his PhD at TUE was awarded by his institution to attend the training course on Valorisation of Scientific Results in Brussels, which took place between the 1st and 3rd of March 2023. During this training in Brussels, he would be coached by professional venture-building experts while growing a network with entrepreneurs and valorization professionals in Benelux and beyond. He shares his experience in this issue of the STORM-BOTS newsletter:

"The Brussels Science Valorization Masterclass was a very practical and scientist-orientated primer of the business world. It was an eye-opening experience which taught me how different the mindset of an investor is from that of a scientist. The questions that an investor would ask about a new technology are very different from what a scientist would be curious about, which means entrepreneurs with a science background are often not prepared for investors' questions.

Beyond adopting the correct mindset for business, there are many practical financial skills to learn before venturing out into the world of business. It was a pleasure to learn alongside other scientists with an interest in entrepreneurship and it was a great first step towards achieving my aspirations of creating positive social impact through science valorisation."



Other training activities

Experience as session chairs

As a special part of the 3rd STORM-BOTS Symposium, four ESRs could experience and learn how to lead scientific sessions in a conference by acting as chairpersons of the Day 3 and 4 lectures of the 3rd STORM-BOTS Symposium. The ESRs were contacted by the Symposium organiser, to inform them about this opportunity, what this role is and what they should prepare and do during the conferences. Finally, Erick (ESR-3), Lovish (ESR-5), Zixuan (ESR-11) and Giulia (ESR-12) chaired the scientific sessions of the 3rd STORM-BOTS Symposium. Lovish and Zixuan share their experience in this article:

How was the experience of chairing one of the scientific sessions at the 3rd STORM-BOTS Symposium?

“ Zixuan (ESR-11): “It was a great pleasure to chair a session in the symposium. It helps me to know the speakers beforehand and motivates me to step out of the comfort zone.”



“ Lovish (ESR-5): “As the chair of a session at the symposium, my experience has been both enriching and fulfilling. Managing the flow of presentations and encouraging a collab-



orative atmosphere has allowed me to contribute to the exchange of knowledge and ideas. This responsibility has not just improved my organizational abilities but has also made me more aware of the various viewpoints in our community, enhancing my understanding. I'm excited to keep participating and learning more in future sessions.”

Was it as you expected it to be?

“ Zixuan (ESR-11): “It went way better than I expected as the speakers and audience were being so nice. There is no need to worry about being a chairperson at all.”

“ Lovish (ESR-5): “Chairing the symposium session has met my expectations, and I feel satisfied with how the event unfolded.”

What did you find more challenging/harder? And more rewarding?

“ Zixuan (ESR-11): “The stress grew a lot in me as this activity was very new to me. In fact, it was all in your mind and you would find it more rewarding as it turns out not a big deal.”

“ Lovish (ESR-5): “One significant challenge was maintaining a smooth flow of presentations and discussions, ensuring that speakers adhere to their allotted time slots. Successfully managing the session's logistics, such as timekeeping and technical aspects, can bring a sense of accomplishment.”



Dissemination & Communication activities

Scientific publications

Several papers and one review article have been published by our ESRs during the third year of STORM-BOTS. You can read more about them here and follow the links for further information.

Light-driven peristaltic pumping by an actuating splay-bend strip. Klaudia Dradrach, Michał Zmyślony (ESR-7), Zixuan Deng (ESR-11), Arri Priimagi, John Biggins and Piotr Wasylczyk
Nature Communications, 2023, 14, 1877
<https://doi.org/10.1038/s41467-023-37445-5>

Despite spectacular progress in microfluidics, small-scale liquid manipulation, with few exceptions, is still driven by external pumps and controlled by large-scale valves, increasing cost and size and limiting complexity. By contrast, optofluidics uses light to power, control and monitor liquid manipulation, potentially allowing for small, self-contained microfluidic devices. Here we demonstrate a soft light-propelled actuator made of liquid crystal gel that pumps microlitre volumes of water. The strip of actuating material serves as both a pump and a channel leading to an extremely simple microfluidic architecture that is both powered and controlled by light. The performance of the pump is well explained by a simple theoretical model in which the light-induced bending of the actuator competes with the liquid's surface tension. The theory highlights that effective pumping requires a threshold light intensity and strip width. The proposed system explores the benefits of shifting the complexity of microfluidic systems from the fabricated device to spatio-temporal control over stimulating light patterns.

A Scalable, Incoherent-Light-Powered, Omnidirectional Self-Oscillator. Yasaman Nemati (ESR-10), Zixuan Deng (ESR-11), Haotian Pi, Hongshuang Guo, Hang Zhang, Arri Priimagi and Hao Zeng.
Advanced Intelligent Systems, 2023, 2300054
<https://pubs.acs.org/doi/pdf/10.1021/acsami.1c21024>

Light-fueled self-oscillators based on stimuli-responsive soft materials have been explored toward the realization of a myriad of nonequilibrium robotic functions, such as adaptation, autonomous locomotion, and energy conversion. However, the high energy density and unidirectionality of the light field, together with the unscalable design of the existing demonstrations, hinder their further implementation. Herein, a light-responsive lampshade-like smart material assembly as a new self-oscillator model that is unfettered by the abovementioned challenges, is introduced. Liquid crystal elastomer with low phase transition temperature is used as the photomechanical component to provide twisting movement under low-intensity incoherent light field. A spiral lampshade frame ensures an equal amount of light being shadowed as negative feedback to sustain the oscillation upon constant light field from omnidirectional excitation (0°–360° azimuth and 20°–90° zenith). Different-sized oscillators with 6, 15, and 50 mm in diameter are fabricated to prove the possibility of scaling up and down the concept. The results provide a viewpoint on the fast-growing topic of self-oscillation in soft matter and new implications for self-sustained soft robots.

Dissemination & Communication activities

Equilibrium and transient response of photo-actuated Liquid Crystal Elastomer beams. Reza Norouzikudiani (ESR-6), Alessandro Lucantonio and Antonio DeSimone. Mechanics Research Communications, 2023, 131, 104126
<https://doi.org/10.1016/j.mechrescom.2023.104126>

Light actuation is one of the preferred and advantageous approaches to remotely induce and control deformations in soft materials such as photoactive Liquid Crystal Elastomers (LCEs). Various experimental and numerical works have been carried out in the literature to study the actuation of photoactive LCE sheets under illumination. In this study, we have developed a reduced multi-physics model to predict the equilibrium and dynamic response of photoactive LCE beams under illumination. We test our model against an experiment in which a double-clamped thin nematic LCE beam is subjected to UV light, and the stress is generated in the beam due to induced contraction under illumination. Our numerical results demonstrate reasonable agreement with the experiment regarding stress evolution trend and saturation time. We also investigate the bending response of a photoactive LCE beam subjected to UV light. Based on our parameters, we observe that the nematic beam bends towards the light only due to the photochemical strain gradient along the thickness. Finally, to test our model in a dynamic situation, we perform the simulation for the self-oscillations of an LCE beam under illumination. We show that the alternate activation of the top and bottom surfaces of the LCE beam by uniform steady illumination can pump energy into the system, resulting in the phenomenon of self-oscillations.

Liquid Crystal Networks Meet Water: It's Complicated. Natalie P. Pinchin, Hongshuang Guo, Henning Meteling, Zixuan Deng (ESR-11), Arri Priimägi and Hamed Shahsavan. Advanced Materials, 2023, 14:1877
<https://doi.org/10.1002/adma.202303740>

Soft robots are composed of compliant materials that facilitate high degrees of freedom, shape-change adaptability, and safer interaction with humans. An attractive choice of material for soft robotics is crosslinked networks of liquid crystal polymers (LCNs), as they are responsive to a wide variety of external stimuli and capable of undergoing fast, programmable, complex shape morphing, which allows for their use in a wide range of soft robotic applications. However, unlike hydrogels, another popular material in soft robotics, LCNs have limited applicability in flooded or aquatic environments. This can be attributed not only to the poor efficiency of common LCN actuation methods underwater but also to the complicated relationship between LCNs and water. In this review, the relationship between water and LCNs is elaborated and the existing body of literature is surveyed where LCNs, both hygroscopic and non-hygroscopic, are utilized in aquatic soft robotic applications. Then the challenges LCNs face in widespread adaptation to aquatic soft robotic applications are discussed and, finally, possible paths forward for their successful use in aquatic environments are envisaged.

Multi-Modal and Multi-Stimuli 4D Printed Magnetic Composite Liquid Crystal Elastomer Actuators. Erick René Espíndola-Pérez, Javier Jesús Campo, Carlos Sánchez-Somolinos. ACS Applied Materials & Interfaces, 2023, 15:14607
<https://doi.org/10.1021/acsami.3c14607>

Liquid crystal elastomer (LCE)-based soft actuators are being studied for their significant shape-changing abilities when they are exposed to heat or light. Nevertheless, their relatively slow response compared with soft magnetic materials limits their application possibilities. Integration of magnetic responsiveness with LCEs has been previously attempted; however, the LCE response is typically jeopardized in high volumes of magnetic microparticles (MMPs). Here, a multistimuli, magnetically active LCE (MLCE), capable of producing programmable and multimodal actuation, is presented. The MLCE, composed of MMPs within an LCE matrix, is generated through extrusion-based 4D printing that enables digital control of mesogen orientation even at a 1:1 (LCE:MMPs) weight ratio, a challenging task to accomplish with other methods. The printed actuators can significantly deform when thermally actuated as well as exhibit fast response to magnetic fields. When combining thermal and magnetic stimuli, modes of actuation inaccessible with only one input are achieved. For instance, the actuator is reconfigured into various states by using the heat-mediated LCE response, followed by subsequent magnetic addressing. The multistimuli capabilities of the MLCE composite expand its applicability where common LCE actuators face limitations in speed and precision. To illustrate, a beam-steering device developed by using these materials is presented.

Dissemination & Communication activities

Conferences

During this third year of the project, the ESRs have participated in several conferences and workshops, presenting their results in the form of posters and oral communications.

It is worth noting the participation of several STORM-BOTS members, both ESRs and supervisors, in the ILCEC 2023 last October.

STORM-BOTS members at the ILCEC2023. From left to right Hao Zeng, Dirk Broer, Antonio DeSimone, Carlos Sánchez-Somolinos, Danqing Liu, Lovish Gulati, Arri Priimägi, Paolo Sartori, Michał Zmysłony and Zixuan Deng.



Giulia (ESR-12)

2023 Spring Meeting of the Materials Research Society

San Francisco, US – April 2023

Giulia gave a talk titled *Electrically Driven Liquid Crystal Elastomer Actuator Matrix for Haptic Surfaces*.

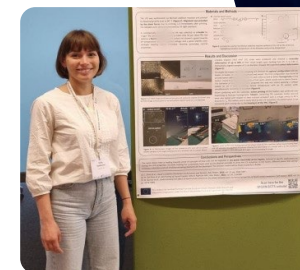


Giulia (ESR-12)

IEEE World Haptics 2023 conference

Delft, NE – July 2023

Giulia presented a poster titled *Electrically driven Liquid Crystal Elastomer Actuator Matrix for Haptic Surfaces*

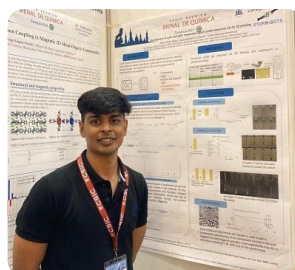


Rahul (ESR-2)

XXXIX Biental conference of the Royal Spanish Society of Chemistry

Zaragoza, ES – June 2023

Rahul presented a poster titled *Development of a pH- and light-responsive liquid crystal elastomer ink for 3D printing*

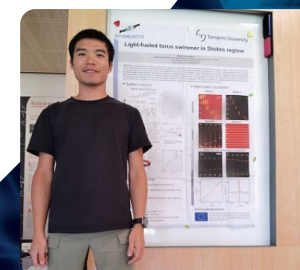


Zixuan (ESR-11)

Bio-inspired aerial and aquatic locomotion workshop

Les Houches, FR – September 2023

Zixuan presented a poster titled *Light-fueled torus swimmer in Stokes regime*



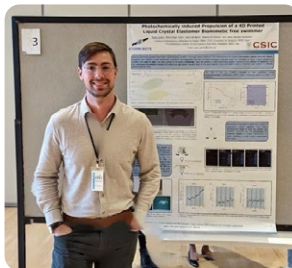
Dissemination & Communication activities

Paolo (ESR-4)

International Liquid Crystal Elastomer Conference 2023

Boulder, US – October 2023

Paolo presented a poster titled Photochemically induced Propulsion of a 4D Printed Liquid Crystal Elastomer Biomimetic free swimmer



Lovish (ESR-5)

International Liquid Crystal Elastomer Conference 2023

Boulder, US – October 2023

Lovish gave a presentation titled 3D director alignment of liquid crystalline structures using magnetic fields



Michał (ESR-7)

International Liquid Crystal Elastomer Conference 2023

Boulder, US – October 2023

Michał presented a poster titled Vector Slicer for rapid generation of print-paths for 3D printing of complex director patterns



Zixuan (ESR-11)

International Liquid Crystal Elastomer Conference 2023

Boulder, US – October 2023

Zixuan gave a presentation titled Light-fueled self-sustained cilia



Communication activities



Art meets science – Zixuan's materials come to life in art exhibition

In September 2023, the HAM Gallery in Helsinki, Finland hosted an exhibition titled 'Abiotic Variables feat. Alien Babies' by artist Laura Dahlberg. The exhibition showcased the liquid crystal-based soft robots developed by Zixuan Deng (ESR-11) and his supervisor at Tampere University. These soft robots were brought to life in the exhibition thanks to their actuation properties, which allowed them to react to different stimuli such as light.

Giulia presents her work at the TEDxForteDeiMarmi event

Giulia Spallanzani (ESR-12), who is doing her PhD at TNO, shared her knowledge on electronic skins as a speaker at the TEDx Forte Dei Marmi event in Italy on September 1, 2023. The theme of this event was Design a Sustainable Future. Giulia tells us about her experience as a speaker at this renowned event:

"Participating in a TEDx giving my own talk was an incredible opportunity! I've always watched those talks with admiration but never thought of giving one, at least not at this stage of my career. When this friend from my hometown contacted me to ask me if I was interested in proposing a topic related to science, I really couldn't miss this boat. Electronic skins as a mean to create

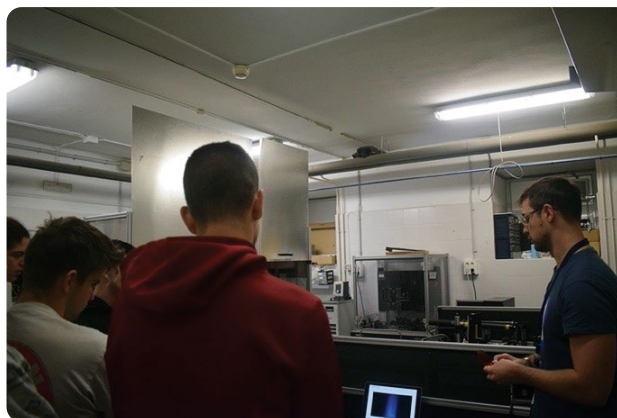
a more inclusive world were my chosen topic, so to present to the audience what our field of research aspires to. Indeed, I was excited and nervous, but I was surprised myself when, during my talk, after a few initial seconds, I was feeling sure on stage as the audience was following me through some experiments. Although I wish I could say I was born with public speaking in my blood, that is not really true... I prepared this talk with a speaker coach from the TEDx crew, Eliana, with whom we spent a few months refining the structure and the key passages of the talk to the detail. It was an incredible experience and even more, as I couldn't choose a better place and time for it to be than the sunset by the beach where I grew up."



Communication activities

European Researchers' Night 2023

STORM-BOTS made an appearance at the European Researcher's Night in September! Rahul (ESR-2, UZ), Paolo (ESR-4, CSIC) and Giulia (ESR-12, TNO) showcased their research on Liquid Crystal Elastomers, 4D printing and soft robotics to the public of the ERN'23 in Zaragoza. The experience was incredibly rewarding for ESRs and all the participants, looking forward to next year's edition!



Lab visit CSIC

ESRs at CSIC, Erick (ESR-3) and Paolo (ESR-4), offered a lab visit to high school students in October 2023. They shared their background and training, and how they became researchers of a Marie Skłodowska-Curie action as STORM-BOTS. The students also visited the lab and could see the day-to-day research work carried out by Erick and Paolo.



Network updates

MATHIS LAGIER
ESR-1

TU/e EINDHOVEN
UNIVERSITY OF
TECHNOLOGY

Research topic:
Electrically driven
polymers for active
antennae





This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101019718

Welcome Mathis Lagier – ESR-1

Mathis Lagier joined STORM-BOTS last October 2023 as ESR-1. He will conduct his research work at Eindhoven University of Technology under the supervision of Danqing Liu (TUe). Welcome to the STORM-BOTS team, Mathis!

Upcoming Events

For the fourth and last year of the project, there will be many more activities focused on the training of the STORM-BOTS ESRs.

Two network-wide training events are planned for 2024. From the 1st to the 3rd of February, we will meet in Zaragoza, Spain, to participate in the STORM-BOTS Workshop “LCE-based Soft Robotics: From Materials to Functions” organised by CSIC. This workshop will consist of lectures from renowned researchers in the fields of liquid crystal elastomers and soft robotics, as well as presentations of the projects and results of the STORM-BOTS ESRs. Networking and discussion activities are planned for the last day of the workshop.

The 4th STORM-BOTS Symposium will take place in Eindhoven, The Netherlands, from the 13th to the 17th of May, organised by TUe. This workshop is focused on the potential applications of LCE-based materials and their soft robotic functions.

At the final stretch of their scientific projects, publications and presentations at international conferences will be of the most importance in the following year. The secondments will take special relevance for the ESRs and their projects during the next year, with the final secondments taking place.





This project has received funding from the European Union's Horizon2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956150



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Beneficiaries



MAX-PLANCK-GESELLSCHAFT



Partner Organisations

